

SEQUENCE LISTING

<110> Gutteridge, Steve
Harvell, Leslie T.
Orozco, Buddy

<120> Plant Genes Encoding Pantothenate Synthetase

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<151> 2000-11-13

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<212> DNA

<213> Zea mays

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<212> PRT

<213> Zea mays

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 Ser Leu Ile Ser Ala Ala Val Ala Ala Ser Ala Gly Pro Ile Ala Val
 50 55 60
 Val Val Ser Ile Tyr Val Asn Pro Ser Gln Phe Ala Pro Thr Glu Asp
 65 70 75 80
 Leu Ala Thr Tyr Pro Ser Asp Phe Ala Gly Asp Leu Arg Lys Leu Ala
 85 90 95
 Ala Thr Gly Val Val Ala Ala Val Phe Cys Pro Pro Asp Leu Tyr Val
 100 105 110
 Arg Gly Ser Ala Asp Arg Pro Ser Ala Ala Gly Ala Ser Gly Gly Ala
 115 120 125
 Val Ser Cys Leu Glu Asp Ala Gly Gly His Ala His Glu Thr Trp Ile
 130 135 140
 Arg Val Glu Arg Leu Glu Lys Gly Leu Cys Gly Ser Ser Arg Pro Val
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 Glu Pro Asp Val Ala Val Phe Gly Lys Lys Asp Tyr Gln Gln Trp Arg
 180 185 190
 Val Ile Cys Arg Met Val Arg Asp Leu Asp Phe Ala Ile Gln Ile Val
 195 200 205
 Gly Ser Glu Val Val Arg Glu Ala Asp Gly Leu Ala Met Ser Ser Arg
 210 215 220
 Asn Val Asn Leu Ser Glu Glu Asp Arg Lys Lys Ala Leu Ser Ile Ser
 225 230 235 240
 Arg Ser Leu Val Asp Ala Arg Thr Ala Ala Leu Ser Gly Ser Asn Arg
 245 250 255
 Ser Gln Glu Ile Lys Asp Gln Ile Val Arg Thr Ile Thr Glu Ala Gly
 260 265 270
 Gly Gln Val Asp Tyr Val Glu Ile Val Gly Gln Glu Ser Leu Val Pro
 275 280 285
 Val Glu Arg Met Asp Arg Pro Cys Val Ile Cys Val Ala Ala Trp Phe
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 <212> PRT
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 Ala Leu Val Pro Thr Met Gly Phe Leu His Glu Gly His Leu Ser Leu
 35 40 45
 Val Ser Ala Ala Val Ala Ala Ser Ala Gly Pro Val Ala Val Val Val
 50 55 60
 Ser Ile Tyr Val Asn Pro Ser Gln Phe Ala Pro Thr Glu Asp Leu Ala
 65 70 75 80

Thr Tyr Pro Ser Asp Phe Ala Gly Asp Leu Gly Lys Leu Ala Ala Thr
 85 90 95
 Gly Val Val Ala Ala Val Phe Cys Pro Pro Asp Leu Tyr Val Arg Gly
 100 105 110
 Ser Ala Asp Arg Pro Ser Ala Ala Ser Ala Ser Gly Gly Ala Val Ser
 115 120 125
 Cys Leu Glu Asp Ala Gly Gly His Ala His Glu Thr Trp Ile Arg Val
 130 135 140
 Glu Arg Leu Glu Lys Gly Leu Cys Gly Ser Ser Arg Pro Val Phe Phe
 145 150 155 160
 Arg Gly Val Ala Thr Val Val Ala Lys Leu Phe Asn Ile Val Glu Pro
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 Asp Val Ala Val Phe Gly Lys Lys Asp Tyr Gln Gln Trp Arg Val Ile
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 195 200 205
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 225 230 235 240
 Leu Val Asp Ala Arg Thr Ala Thr Leu Ser Gly Ser Asn Arg Ser Gln
 245 250 255
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 Val Asp Tyr Val Glu Ile Val Glu Gln Glu Ser Leu Val Pro Val Glu
 275 280 285
 Arg Met Asp Arg Pro Cys Val Ile Cys Val Ala Ala Trp Phe Gly Lys
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 <211> 1644
 <212> DNA
 <213> Eucalyptus grandis

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<211> 1183

<212> DNA

<213> Eucalyptus grandis

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<211> 311

<212> PRT

<213> Eucalyptus grandis

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Leu Val Pro Thr Met Gly Phe Leu His Glu Gly His Leu Ser Leu Val
  35              40              45

Arg Glu Ala Arg Arg Arg Ala Asp Ala Val Val Val Ser Val Tyr Val
  50              55              60

Asn Pro Gly Gln Phe Ala Pro Ser Glu Asp Leu Ser Thr Tyr Pro Ser
  65              70              75              80

Asp Phe Glu Gly Asp Leu Gly Lys Leu Arg Ala Val Pro Gly Gly Val
  85              90              95

Asp Val Val Phe Arg Pro Gln Asn Leu Tyr Asp Tyr Gly Gln Arg Glu
  100             105             110

Val Gly Gly Ser Gly Val Glu Ser Asp Asn Gly Ser Val Ser Cys Leu
  115             120             125

Glu Glu Lys Gly Met Gly His Glu Ala Trp Val Arg Val Glu Arg Leu
  130             135             140

Glu Lys Gly Met Cys Gly Lys Ser Arg Pro Val Phe Phe Arg Gly Val
  145             150             155             160

Ala Thr Val Val Thr Lys Leu Phe Asn Ile Val Glu Pro Asp Val Ser
  165             170             175

Val Phe Gly Lys Lys Asp Tyr Gln Gln Trp Arg Ile Ile Arg Arg Leu
  180             185             190

Val Asn Leu Asp Phe Ser Ile Gln Val Ile Gly Ser Glu Val Met Arg
  195             200             205

Asp His Asp Gly Leu Ala Leu Ser Ser Arg Asn Val His Leu Ser Pro
  210             215             220

Glu Glu Arg Glu Lys Ala Leu Ser Ile Ser Arg Ser Leu Ser Arg Ala
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Lys Ser Ala Ala Glu Lys Gly Gln Val Asn Cys Gln Asn Leu Lys Asp
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Ser Val Ile Gln Ala Ile Gln Glu Ala Gly Gly Lys Ile Asp Tyr Ala
  260             265             270

Glu Ile Val Asp Gln Glu Ser Leu Glu Ala Val Glu Glu Ile Arg Ser
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Asp Asn Ile Glu Ile Asn Val
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 <212> DNA
 <213> Glycine max

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 <212> PRT
 <213> Glycine max

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 Thr Met Gly Phe Leu His Ala Gly His Leu Ser Leu Val Ala Gln Ala
 35 40 45
 Arg Gln Leu Ser Asp Val Val Ala Val Ser Ile Tyr Val Asn Pro Gly
 50 55 60
 Gln Phe Ala Pro Thr Glu Asp Leu Ser Thr Tyr Pro Ser Asp Phe Asp
 65 70 75 80
 Gly Asp Val Lys Lys Leu Ala Ser Val Pro Gly Gly Val Asp Val Val
 85 90 95
 Phe His Pro Arg Asn Leu Tyr Asp Tyr Gly Lys Asn Gly Gly Gly Asp
 100 105 110

Val Ala Glu Ala Gly Gly Met Val Ser Cys Val Glu Ser Gly Ser Gly
115 120 125

His Glu Ser Trp Val Arg Val Glu Lys Leu Glu Leu Gly Leu Cys Gly
130 135 140

Lys Ser Arg Pro Val Phe Phe Arg Gly Val Ala Thr Val Val Thr Lys
145 150 155 160

Leu Phe Asn Ile Val Glu Pro Asp Val Ala Val Phe Gly Lys Lys Asp
165 170 175

Tyr Gln Gln Trp Arg Leu Ile Gln Arg Met Val Arg Asp Leu Asp Phe
180 185 190

Ser Ile Lys Val Ile Gly Ala Glu Ile Thr Arg Asp Asn Asp Gly Leu
195 200 205

Ala Met Ser Ser Arg Asn Val His Leu Ser Pro Glu Glu Arg Glu Lys
210 215 220

Ala Leu Ser Ile Asn Lys Ser Leu Leu Arg Ala Lys Ser Ala Ala Gly
225 230 235 240

Asp Gly Gln Val His Cys Glu Lys Leu Thr Asn Leu Val Ile Gln Ser
245 250 255

Val Thr Asp Ala Gly Gly Arg Ile Asp Tyr Ala Glu Ile Val Asp Gln
260 265 270

Asn Asn Leu Glu Lys Val Glu Gln Ile Lys Ser Pro Val Val Phe Cys
275 280 285

Val Ala Ala Trp Phe Gly Lys Val Arg Leu Ile Asp Asn Met Glu Ile
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Asn Leu Ser Met Asn Val
305 310

<210> 10
<211> 1148
<212> DNA
<213> Tulipa fosteriana

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aaaatgggag cagcagctgc caagaactta aagatatagc cactcaaagc ataacagagg 780
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<210> 11
<211> 296
<212> PRT
<213> Tulipa fosteriana

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      20             25             30

His His Arg Arg Leu Ser His Thr Ile Ala Leu Val Pro Thr Met Gly
      35             40             45

Ser Leu His Ala Gly His Leu Ser Leu Ile Ser His Ala Ala Ser Leu
      50             55             60

Ala Asp Leu Thr Val Val Ser Ile Tyr Leu Asn Pro Thr Gln Phe Ala
      65             70             75             80

Pro Ser Glu Asp Leu Ala Thr Tyr Pro Ala Asp Leu Ala Ala Asp Leu
      85             90             95

Arg Asn Leu Arg Ala Cys Pro Ser Val Ala Ala Val Phe Cys Pro Thr
      100            105            110

Asn Pro Tyr Ala Asp Gly His Glu Thr Trp Val Arg Val Glu Glu Leu
      115            120            125

Glu Arg Gly Leu Cys Gly Leu Ser Arg Pro Val Phe Phe Arg Gly Val
      130            135            140

Ala Thr Val Val Ser Lys Leu Phe His Leu Val Glu Pro Asp Val Ala
      145            150            155            160

Val Phe Gly Lys Lys Asp Phe Gln Gln Trp Arg Val Ile Glu Lys Met
      165            170            175

Val Arg Asp Leu Asp Phe Pro Val Arg Ile Val Gly Ser Glu Ile Val
      180            185            190

Arg Glu Val Asp Gly Leu Ala Met Ser Ser Arg Asn Val Arg Leu Thr
      195            200            205

Pro Glu Glu Arg Glu Lys Ala Leu Ser Ile Ser Arg Ser Leu Ser Arg
      210            215            220

Ala Lys Val Ala Ala Gln Asn Gly Ser Ser Ser Cys Gln Glu Leu Lys
      225            230            235            240

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Asp Ile Ala Thr Gln Ser Ile Thr Glu Ala Gly Gly Arg Ile Asp Tyr
245 250 255

Val Glu Ile Val Asp Gln Glu Ser Leu Lys Val Val Leu Asp Ile Thr
260 265 270

Ser Pro Val Val Met Cys Ile Ala Ala Trp Phe Gly Asn Val Arg Leu
275 280 285

Ile Asp Asn Met Glu Ile Thr Ile
290 295

<210> 12
<211> 1235
<212> DNA
<213> Triticum aestivum

<400> 12
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tggctcgggc gccacggggc ggagggaag acgggtggtgc tcgtgcccac catgggcttc 180
ctccacgagg gccacctctc gctcgtctcc gccgcggcgg ccgtgcccgg ccccgctcgc 240
gtcgtcgtct ccatctacgt caaccccagc cagttcgccc ccaccgagga cctcgccacc 300
taccctcccg acctcgccgg ggacctccgc aagctcgcc ccccgggcgc cgtccacgcc 360
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gctcccgccg gcgcgctgc ctcttcctgc ctggaggcgg gcggggacgg gcacgagact 480
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tttgccgtag agataatagg agcagaaata gtgcgagaag cagatggtct tgccatgagc 720
tctcgcaacg tccacctctc gcctgaggaa agggagaagg cattatccat tagtagatca 780
ctgttaaatg ctagaactgc tgcgttgaat aatagcaaca gtgctagcga acatataaag 840
gatcagatag tgcagacgct gactgaagct ggcggtcggg ttgattatgt tgagattgtg 900
gagcaggaag gtttggtacc tgtggagacg atcgaccgcc ctgttgctcat ttgtgtcgcc 960
gcatggtttg gaaaggttag attgatcgat aatatcgaaa ttcataata atcctgagga 1020
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aataagaatg atgttgtaca atgtaagttt gtaacaacca cgtacagaga acttgcaaaa 1140
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<210> 13
<211> 316
<212> PRT
<213> Triticum aestivum

<400> 13
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Arg Ala Trp Ser Arg Arg Gln Arg Ala Glu Gly Lys Thr Val Val Leu
20 25 30

Val Pro Thr Met Gly Phe Leu His Glu Gly His Leu Ser Leu Val Ser
35 40 45

Ala Ala Ala Ala Val Pro Gly Pro Val Ala Val Val Val Ser Ile Tyr
50 55 60

Val	Asn	Pro	Ser	Gln	Phe	Ala	Pro	Thr	Glu	Asp	Leu	Ala	Thr	Tyr	Pro	
65					70					75					80	
Ser	Asp	Leu	Ala	Gly	Asp	Leu	Arg	Lys	Leu	Ala	Ser	Thr	Gly	Ala	Val	
				85					90						95	
His	Ala	Val	Phe	Asn	Pro	Pro	Asp	Leu	Tyr	His	Arg	Gly	Ala	Ala	Val	
			100					105					110			
Ser	Gly	Arg	Arg	Ala	Glu	Ala	Pro	Ala	Gly	Ala	Ala	Ala	Ser	Ser	Cys	
		115					120					125				
Leu	Glu	Ala	Gly	Gly	Asp	Gly	His	Glu	Thr	Trp	Ile	Arg	Val	Glu	Arg	
	130					135					140					
Leu	Glu	Lys	Gly	Leu	Cys	Gly	Ala	Ser	Arg	Pro	Val	Phe	Phe	Arg	Gly	
145					150					155					160	
Val	Ala	Thr	Val	Val	Ala	Lys	Leu	Phe	Asn	Val	Val	Glu	Pro	Asp	Val	
				165					170					175		
Ala	Met	Phe	Gly	Lys	Lys	Asp	Tyr	Gln	Gln	Trp	Arg	Leu	Ile	Cys	Arg	
			180					185						190		
Met	Val	Arg	Asp	Leu	Asp	Phe	Ala	Val	Glu	Ile	Ile	Gly	Ala	Glu	Ile	
		195					200					205				
Val	Arg	Glu	Ala	Asp	Gly	Leu	Ala	Met	Ser	Ser	Arg	Asn	Val	His	Leu	
	210					215					220					
Ser	Pro	Glu	Glu	Arg	Glu	Lys	Ala	Leu	Ser	Ile	Ser	Arg	Ser	Leu	Leu	
225					230					235					240	
Asn	Ala	Arg	Thr	Ala	Ala	Leu	Asn	Asn	Ser	Asn	Ser	Ala	Ser	Glu	His	
				245					250					255		
Ile	Lys	Asp	Gln	Ile	Val	Gln	Thr	Leu	Thr	Glu	Ala	Gly	Gly	Arg	Val	
		260						265						270		
Asp	Tyr	Val	Glu	Ile	Val	Glu	Gln	Glu	Ser	Leu	Val	Pro	Val	Glu	Thr	
	275						280					285				
Ile	Asp	Arg	Pro	Val	Val	Ile	Cys	Val	Ala	Ala	Trp	Phe	Gly	Lys	Val	
	290					295					300					
Arg	Leu	Ile	Asp	Asn	Ile	Glu	Ile	His	Ile	Gln	Ser					
305				310						315						

<210> 14

<211> 313

<212> PRT

<213> Oryza sativa

<400> 14

Met	Ala	Ala	Pro	Arg	Glu	Pro	Glu	Val	Ile	Arg	Asp	Lys	Ala	Ala	Met	
1				5					10					15		

Arg	Ala	Trp	Ser	Arg	Arg	Arg	Arg	Ala	Glu	Gly	Lys	Thr	Val	Ala	Val	
			20					25					30			

Val Pro Thr Met Gly Tyr Leu His Gln Gly His Leu Ser Leu Ile Ser
 35 40 45
 Ala Ala Ala Ala Ala Ala Ser Ala Asp Pro Val Ala Ile Val Val Thr
 50 55 60
 Ile Tyr Val Asn Pro Ser Gln Phe Ala Pro Ser Glu Asp Leu Ala Thr
 65 70 75 80
 Tyr Pro Ser Asp Phe Ala Gly Asp Leu Arg Lys Leu Ala Ser Thr Gly
 85 90 95
 Val Val Asp Ala Val Phe Asn Pro Pro Asp Leu Tyr Val Arg Gly Ala
 100 105 110
 Gly Arg Arg Gly Ala Gly Ser Gly Gly Ala Ile Ser Cys Leu Glu Glu
 115 120 125
 Ala Ala Gly Asp Gly His Glu Thr Trp Val Arg Val Glu Arg Leu Glu
 130 135 140
 Lys Gly Leu Cys Gly Ala Ser Arg Pro Val Phe Phe Arg Gly Val Ala
 145 150 155 160
 Thr Ile Val Ser Lys Leu Phe Asn Ile Ile Glu Pro Asp Val Pro Val
 165 170 175
 Phe Gly Lys Lys Asp Tyr Gln Gln Trp Arg Val Ile Leu Pro Tyr Trp
 180 185 190
 Ser Gly Leu Asp Phe Gly Ile Glu Ile Met Gly Ser Arg Asn Cys Ala
 195 200 205
 Arg Thr Asp Gly Leu Ala Met Asn Ser Arg Asn Val His Leu Ser Arg
 210 215 220
 Glu Glu Gly Lys Lys Ala Leu Ser Ile Ser Arg Ser Leu Val Asp Ala
 225 230 235 240
 Arg Thr Gly Ala Leu Lys Gly Asn Thr Asp Ser Lys Gln Ile Lys Asn
 245 250 255
 Lys Ile Val Gln Thr Leu Thr Glu Thr Gly Gly Gln Val Asp Tyr Val
 260 265 270
 Glu Ile Val Glu Gln Glu Ser Leu Val Pro Val Glu Gln Ile Asp Gly
 275 280 285
 Pro Val Val Ile Cys Val Ala Ala Trp Phe Gly Lys Val Arg Leu Ile
 290 295 300
 Asp Asn Ile Glu Ile Asp Thr Arg Ser
 305 310

<210> 15
 <211> 308
 <212> PRT
 <213> Lotus japonicus

<400> 15

Met	Ala	Pro	Met	Val	Ile	Ser	Asp	Lys	Asp	Glu	Met	Arg	Lys	Trp	Ser	1	5	10	15
Arg	Ser	Met	Arg	Ser	Gln	Gly	Lys	Leu	Ile	Ala	Leu	Val	Pro	Thr	Met	20	25	30	
Gly	Phe	Leu	His	Glu	Gly	His	Leu	Ser	Leu	Val	Arg	Asp	Ala	His	Asn	35	40	45	
His	Ala	Asp	Leu	Val	Ala	Val	Ser	Ile	Tyr	Val	Asn	Pro	Gly	Gln	Phe	50	55	60	
Ser	Pro	Thr	Glu	Asp	Leu	Ser	Ala	Tyr	Pro	Ser	Asp	Phe	Gln	Gly	Asp	65	70	75	80
Leu	Gln	Lys	Leu	Met	Ser	Val	Pro	Gly	Gly	Val	Asp	Val	Val	Phe	His	85	90	95	
Pro	His	Asn	Leu	Tyr	Asp	Tyr	Gly	Gly	Asp	Gly	Gly	Asp	Ala	Val	Ala	100	105	110	
Glu	Cys	Gly	Gly	Asp	Gly	Val	Val	Ser	Cys	Val	Asp	Arg	Arg	Ser	Gly	115	120	125	
Phe	Gly	His	Glu	Thr	Trp	Val	Arg	Ala	Glu	Lys	Leu	Glu	Lys	Pro	Leu	130	135	140	
Cys	Gly	Lys	Ser	Arg	Pro	Val	Phe	Phe	Arg	Gly	Val	Ala	Thr	Ile	Val	145	150	155	160
Thr	Lys	Leu	Phe	Asn	Ile	Val	Glu	Pro	Asp	Val	Ala	Val	Phe	Gly	Lys	165	170	175	
Lys	Asp	Tyr	Gln	Gln	Trp	Lys	Ile	Ile	Gln	Arg	Met	Val	Arg	Asp	Leu	180	185	190	
Asp	Phe	Ser	Ile	Lys	Val	Ile	Gly	Ser	Glu	Val	Ile	Arg	Glu	Lys	Asp	195	200	205	
Gly	Leu	Ala	Met	Ser	Ser	Arg	Asn	Val	Tyr	Leu	Ser	Pro	Glu	Glu	Arg	210	215	220	
Glu	Lys	Ala	Val	Ser	Ile	Asn	Lys	Ser	Leu	Phe	Arg	Ala	Lys	Ser	Ala	225	230	235	240
Ala	Glu	Asp	Gly	Gln	Ile	His	Cys	Glu	Lys	Leu	Ile	Asn	Leu	Val	Val	245	250	255	
Gln	Ser	Ile	Thr	Glu	Ala	Gly	Gly	Arg	Ile	Asp	Tyr	Ala	Glu	Ile	Val	260	265	270	
Asp	Gln	Asn	Asn	Leu	Glu	Lys	Val	Glu	Trp	Ile	Lys	Gly	Pro	Val	Val	275	280	285	
Phe	Cys	Val	Ser	Ala	Trp	Phe	Gly	Lys	Ala	Arg	Leu	Ile	Asp	Asn	Ile	290	295	300	

Glu Ile Asn Leu
305